“It’s what you learn after you know it all that counts.” (Anonymous)

Patients and practices continue to benefit from the rapid evolution of new concepts and techniques in veterinary dentistry. Veterinary dentistry has progressed from the “dental” of the 20th century to the current comprehensive treatment of periodontal and oral disease. The objectives of this presentation are to clarify new concepts, dispel common misconceptions, and improve awareness of current veterinary dentistry and to provide the practitioner with information that can be applied in practice immediately to aid you in delivering quality dental care.

**Update on Terminology – A few words about words**

Veterinary dental nomenclature has evolved. Some common terms used in the past have been replaced by terms that are more accurate, descriptive, and in line with human dentistry when applicable. Some outdated or inaccurate terminology and updated terminology includes:

**Dental** – The word “dental” pertains to tooth or teeth. It is an adjective that has been used to describe a procedure. This misnomer has been replaced with updated terminology.

**Professional dental cleaning** refers to scaling (plaque and calculus removal above and below the gingiva) and polishing of the teeth with power/hand instrumentation performed by a trained veterinary health care provide under general anesthesia.

**Periodontal therapy** refers to treatment of diseased periodontal tissues that includes professional cleaning as defined above and one or more of the following: root planing, gingival curettage, periodontal flaps, regenerative surgery, gingivectomy/plasty, and local administration of antiseptics/antibiotics.

**COHAT** refers to comprehensive oral hygiene, assessment and treatment.

For a comprehensive list (including photos) of current dental and oral nomenclature, refer to [www.avdc.org](http://www.avdc.org). Search under Veterinary Dental Nomenclature.
Debunking the Myths

Facts change as new evidence is revealed. In veterinary medicine we used to treat perianal fistulas (which are now referred to as perianal sinuses) in dogs as a surgical disease, and we used to think that cats didn’t get heartworms. Atopic dermatitis was originally thought to be caused by inhalant allergens and is now believed to involve an altered skin barrier function. Aristotle proclaimed that men had 32 teeth and women had only 28. This was believed to be true for 2000 years! Veterinary dentistry and oral surgery is laden with common misconceptions and myths that have become tradition, and continue to be taught and shared.

Myth: Periodontal disease can be treated by scaling teeth to remove supragingival calculus.

This myth involves two misconceptions. The first misconception is that calculus causes periodontal disease. The primary cause of gingivitis and periodontitis is accumulation of dental plaque (biofilm) on tooth surfaces and the host immune response to that biofilm. Contrary to common belief, calculus is only a secondary etiologic factor. The main role of calculus in periodontal disease is that of being a plaque-retentive surface. The continual assault of plaque (biofilm) on the local immune system causes gingivitis, which in susceptible animals, may progress to periodontitis as the biofilm acts in combination with the host’s immune system to destroy the periodontium (gingiva, cementum, PDL, alveolar bone). The second misconception is that periodontal disease can be treated by cleaning the crowns of the teeth (supragingival scaling). Periodontitis results in subgingival attachment loss and pocket formation which requires treatment other than removal of supragingival calculus and plaque. Periodontal treatment may include: subgingival curettage, root planing, periodontal surgery, and application of a subgingival perioceutic in a biodegradable system. This myth and these misconceptions about calculus are being used to market anesthesia free dentistry.

Pathogenesis of Periodontal Disease (periodontal attachment loss)

- Plaque biofilm induced tissue destruction (periodontal ligament, cementum, alveolar bone, gingiva) “The battlefield is lost in the battle.”

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Pathology is due to the inflammatory response of the host to the bacterial endotoxins in the biofilm

Attachment loss is controllable vs curable

### Periodontal Disease: “7 P’s” Diagnosis & Treatment

1. **Probe** for pockets (chart)
2. **Picture** (radiographs)
3. **Plan** (fix, nix, or refer)
4. **Planing** (open or closed root planing)*
5. **Pack** (Doxirobe® Gel, Clindoral®, Arestin®, Consil®, Osteoallograft™)
6. **Prescribe** (Daily home care protocols, products)
7. **Progress** (preappoint next treatment or refer)

*The most important step of periodontal treatment is mechanical cleaning of the root surfaces. The goal is to decrease pocket depth and reduce inflammation.*

### Scheduling the periodontal patient

**Time** - allotted according to level of periodontal disease

Suggested: Mild - 1 hour, Moderate - 1.5 hours, Advanced - 2 hours+

Include discharge education time in the scheduling

**Fees** – One fee does not fit all! Fees should reflect the procedures performed (eg: cleaning, radiographs, root planing, perioceutic, periodontal surgery, exodontia, and anesthesia time). A consent form that addresses an estimate for services anticipated helps to prevent misunderstandings and disgruntled clients.

**Recall** – according to the level of periodontal disease

Mild: 6-12 months, Moderate: 4-6 months, Advanced: 3-4 months

Schedule a recall at the time of discharge. Create a reminder (email, text or hard copy).

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Discharge – Educate: review radiographs with pet owner

Educate: handouts/models/diagrams

Educate: Patient home dental care instruction/demonstration/recommendation

Provides value for the service provided

**Myth: Accumulation of supragingival calculus on teeth is an indicator of the severity of periodontitis.**

Supragingival calculus may not always indicate the severity of periodontitis. There may be minimal supragingival calculus and gingival recession in animals with advanced periodontitis. Neither periodontal disease nor dental disease can be staged or graded by the amount of calculus on the teeth. Calculus can be scored (calculus indices of I, II, III) based on mild, moderate or severe volumes and location of calculus (see [www.avdc.org](http://www.avdc.org) for indices). However, the calculus index does NOT indicate stage of disease. A recently new misconception regarding calculus is becoming widespread. “Dental disease” is being staged in some practices by grading the level of calculus: with Stage 4 dental disease having the most calculus. This staging system is a misconception. Calculus is not dental disease at all, doesn’t cause dental disease, and removal does not treat dental disease.³ Periodontal probing and intraoral radiography is used to indicate severity of periodontitis. Periodontal disease can affect any patient. There is a predisposition for this disease in small breed dogs. The process is hastened by the higher ratio of tooth size: jaw size in small dogs compared to large dogs. For body weight, the general trend is for a rapid fall in severity of disease (gingival inflammation, furcation exposure, mobility, loss of attachment) from very small (<7 kg) to small (7-13.5 kg), to medium (13.5-27 kg) and little or no further decrease from medium sized to large (>27 kg). The pattern is less obvious for change in extent of calculus.⁴

It has been tradition to wait for accumulation of calculus to occur before recommending dental care. It is in the best interest of the pet, particularly small breed dogs, to be proactive and recommend the first oral exam under anesthesia no later than the age of two years.

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Dispelling Misconceptions

**Misconception: By having my pet’s teeth cleaned every year, I can prevent tooth loss.**

As you already know, dental cleanings do not diagnose or treat the most prevalent cause of tooth loss: periodontal disease. The pet owner may also have the unrealistic expectation that annual professional oral care prevents tooth loss. In reality, the pet owner must be providing some sort of oral health care the remaining 364 days/year to prevent tooth loss. Tooth loss prevention relies on a partnership between veterinarian, pet owner and pet.

**Misconception: Anesthesia-free dentistry provides the same services my veterinarian does, without the use of anesthesia.**

Anesthesia-free dentistry (AFD) or non-professional dental scaling (NPDS), promotes the removal of calculus using an ultrasonic instrument while the pet is being held gently in the lap of the person performing the calculus removal. The procedure being performed is removal of supragingival calculus. There is no oral exam to record pocket depths, diagnosis of oral pathology, or intraoral radiographs. Pathology remains undiagnosed and untreated. The removal of the supragingival calculus is a grooming procedure, at best. The pet owner feels that they have provided dental care for their pet because the calculus is gone and they are relieved to have avoided anesthesia. Proponents of NPDS focus on pet owners’ fear of anesthesia and misconceptions about calculus and periodontal disease. It’s what the NPDS folks “don’t know that hurts your patients”. (See AVDC position statement on NPDS at AVDC.org for details) Because of this misconception, many pet owners are seeking non-professional dental cleaning services.

**Realistic expectations**

An oral exam, including probing and radiographs, performed annually will detect periodontal disease. Periodontal disease can be managed with regular periodontal treatment. It cannot be cured.

**Home Dental Care Recommendations**

The success of periodontal disease control depends on professional care and home dental hygiene. The client and pet must participate in a home care program if the goal is to prevent
increased attachment loss, tooth loss, pain, and decreased quality of health and life in general. If the client or pet are unwilling to participate in this part of the care, disease control will fail in spite of excellent professional care.

Improved Compliance

The key to gaining compliance with home dental care is to find something the client is willing to try and the pet will allow and even enjoy. Daily brushing of the teeth with a pet dentifrice is the most effective and least expensive method of dental home care. It is also the most labor intensive and has the poorest compliance. In my personal experience, clients that have been most compliant with brushing are breeders, groomers, and dental hygienists. A tooth brushing demonstration by trained veterinary staff increases compliance with brushing. The client may want to try a couple to find what is most comfortable for them and their pet. Practice tip: DO NOT open the mouth to brush the teeth. Rather, keep the mouth closed and gently lift the lips to expose the facial surfaces of the teeth. Once the pet is used to this, some (dogs) will allow a rawhide treat to be placed in the mouth for access to the lingual sides of the teeth. The tongue will provide a fair amount of cleaning to the lingual/palatal sides of the teeth. For cats and small dogs, I dispense a CET feline toothbrush (Henry Schein item #309-6372).

For those pets that won’t allow brushing or the client is unwilling or unable to brush their pet’s teeth, recommend a dental diet or chew from the list approved by the Veterinary Oral Health Council (www.vohc.org). The diet should not be fed as a treat, but as a meal as intended, in order to provide the desired effect. Chews should be given at least once daily. Large breed dogs are more willing to chew items that help remove plaque. It is essential not to recommend a chew that is known to fracture teeth. Always include items the pet is chewing in the patient history. The following items will fracture teeth: natural bones (cooked or raw), cattle hooves, nylon bones (any brand), and antlers. Tennis balls are abrasive and should be discouraged as a play item. Balls without “fuzz” are less abrasive.

Evidence-Based Homecare for Prevention of Periodontal Disease

Evidence-based medicine (EBM) has been defined as the integration of the best research evidence with clinical expertise and patient values. A classification (Grades I-IV) has been proposed for dental home care recommendations in veterinary dentistry. The strongest evidence

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Grade I evidence comes from meta-analyses, systematic reviews, and randomized controlled trials in the target species. Grade I evidence can yield strong recommendations. Grade IV evidence comes from weaker studies such as those conducted in other species, reports of expert committees (consensus), descriptive studies, case reports and opinions of respected experts developed on the basis of their clinical experience. Grade IV evidence can yield only weak recommendations. Grade II and Grade III categories of evidence vary depending on the reference, but are not as strong as Grade I evidence.

Studies reviewed by the Veterinary Oral Health Council (VOHC) demonstrate Grade 1 evidence for reduction in plaque or calculus by 20%. Products awarded the VOHC seal are listed at vohc.org. The list is updated annually.

**Antibiotics in Dentistry – An Update**

Historically, antibiotic prophylaxis for prevention of bacteremia associated with dental procedures was based on the opinion that bacteremia caused serious consequences, including but not limited to infectious endocarditis (IE) and prosthetic joint infections (PJI). In people, the frequency of bacteremia from daily activities, such as chewing food, tooth brushing, flossing, use of toothpicks, irrigation devices, and chewing gum is far greater than that caused by an oral procedure. The magnitude of bacteremia during a dental procedure and routine daily activities is similar. The evidence linking IE with dental procedures is minimal. Most cases of IE that are caused by oral bacteria likely result from low-level exposures secondary to routine daily activities.

In April 2007, the American Heart Association (AHA) and American Dental Association (ADA) revised their guidelines regarding prophylactic antibiotics routinely given prior to dental treatment. The updated guidelines state that people who have been given prophylactic antibiotics in the past, but no longer need them, include people with: mitral valve prolapse, rheumatic heart disease, bicuspid valve disease, calcified aortic stenosis and congenital heart conditions such as VSD, ASD or HCM. These revisions are based on scientific evidence that conclude that the risks of taking preventive antibiotics, such as adverse reactions to antibiotics and development of drug resistant

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bacteria, outweigh the benefits for most patients. The exceptions to the revisions include patients with artificial heart valves, a history of infectious endocarditis, cardiac shunts or implants and any cardiac transplant that develops a problem in a heart valve. 7

In 2012, the ADA and the American Academy of Orthopedic Surgeons (AAOS) jointly created an evidence-based guideline and report on the prevention of PJI (prosthetic joint infection) in patients undergoing dental procedures citing antibiotic prophylaxis prior to dental procedures does not reduce the risk of PJI. In 2014, the ADA Council on Scientific Affairs stated: “In general, for patients with prosthetic joint implants, prophylactic antibiotics are not recommended prior to dental procedures to prevent PJI.”

When are antibiotics indicated in veterinary dentistry?

Dental disease in general is NOT an indication for antibiotics and they should not be routinely prescribed. Antibiotics are indicated when oral tissues are overwhelmed by disease (stomatitis, osteomyelitis, ulcers). Antibiotics are not indicated for dental cleanings, extractions (if the periodontium is healthy), major oral surgery, or fresh jaw fractures. In the healthy pet with a complicated tooth fracture (pulp exposure), adjunctive antibiotics are not required for endodontic therapy. If endodontic therapy cannot be provided, the tooth should be extracted. Bacteremia persisted 10 to 60 minutes in Greyhounds undergoing periodontal therapy and was NOT correlated to the severity of periodontal disease. In the uncommon case in which antibiotics are indicated, a single IV dose given 30-60 minutes prior to manipulation of oral tissues is most appropriate since bacteremia should persist no longer than two hours. The goal is to decrease magnitude of bacteremia since complete prevention is unrealistic.

Indications for perioperative antibiotics include:

1. Several days preoperative in severe gingivitis/stomatitis patients to improve health of tissues to be sutured
2. Immediately preoperative (single IV dose) in patients with diabetes, orthopedic or cardiac implants, or immunosuppression (chemotherapy, Cushing’s disease, etc.)

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3. Several days postoperative, if distant site surgery still healing. Blood clots in distant surgery sites may be loaded with bacteria.10

4. In patients with severe oral infection that have underlying systemic disease (clinically evident cardiac, hepatic, and renal diseases)11

The use of antibiotics will not protect against poorly performed oral surgery. Within plaque biofilm, the surrounding slime matrix effectively protects its resident bacteria from antimicrobials.12 Ask yourself: What am I treating? Oral tissues? Rest of the body? Both?

**Antibiotic Selection**

There are several hundred bacterial species in normal and diseased mouths of dogs and cats. There are many more that can’t be cultured in vitro. For this reason, culture and sensitivity testing of oral disease is rarely indicated. In a comparative study of healthy oral microbiome (genetic material of all the microorganisms in the mouth) in humans, dogs and cats, the following differences were found: 1) Gram-negative species were more abundant in subgingival samples in healthy dogs and Gram positive predominated in dogs having periodontitis. The predominant genera of oral bacteria in cats was also Gram-negative. The microbial diversity was reduced in cats having stomatitis and Pasteurella multocida predominated. The percentage of gram-positive species increased as periodontal health declined. The study refuted the long-held belief that the oral microbiome of cats and dogs was analogous to that of humans. In fact, the oral healthy microbiome in humans is dominated by Gram-positive bacteria belonging to the genus *Streptococcus*. 13 Clinical periodontal disease may occur when the immune tolerance to normal oral microbiome shifts to an inflammatory response. Could this be in response to an imbalance in the oral microbiome? We know that in healthy animals, the microbiota and the immune system maintain a balance so that excessive immune and inflammatory responses are avoided. Dysbiosis (disturbance in the composition of the microbiota) trigger respiratory allergies, atopy, and inflammatory bowel disease in dogs and cats.14

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The selection of an appropriate antibiotic should be based on published data regarding susceptibility testing and the needs of the patient, rather than culture and sensitivity. In a study evaluating subgingival bacteria in dogs and susceptibility to antibiotics, bacterial resistance to tested antibiotics was generally high. Anaerobic bacteria appeared to be susceptible to amoxicillin + clavulanic acid, doxycycline, and erythromycin, while aerobic bacteria appeared to be susceptible to amoxicillin + clavulanic acid, erythromycin, gentamycin, and sulfa-trimethoprim. *Bacteroides fragilis* was resistant to all of the antibiotics tested. *P. multocida* and α-hemolytic *Streptococcus* were resistant to antibiotics tested except for erythromycin (60% resistant). 15 Both metronidazole and clindamycin have been reported as effective adjunctive agents for treatment of periodontal disease *in people*, but conclusive evidence supporting this role is only available for metronidazole and amoxicillin in combination and for spiramycin. 16

**Judicious Antibiotic Prescription – Overcoming barriers**

Inappropriate antibiotic prescription occurs for many reasons, including demand from pet owners, time pressure and diagnostic uncertainty. Some believe that prophylactic antibiotic therapy benefits outweigh risks. With the increased risk and evidence of antibiotic resistance and dramatic increase in MRSA and MRSP cases in animals and humans, this belief is outdated. Studies have shown that pediatricians prescribe antibiotics significantly more often, if they feel parents expect them, and significantly less often, if they feel parents do not expect them. 17 The way to overcome this situation is to educate pet owners. Review periodontal disease and treatment strategies. If plaque accumulation is prevented, periodontal disease does not develop. Management of existing periodontal disease requires daily plaque removal, calculus reduction, suppression of the inflammatory response, surgical management of periodontal pockets, and occasionally exodontia.

There is a shift in focus to the prevention and treatment of oral disease rather than the prevention of bacteremia with antibiotic prophylaxis. 18 Antibiotics should never be considered a monotherapy for treatment of oral infection and should not be used as preventive management of oral conditions.

Resources:

1. Find the AVDC position statement on Non-Professional Dental Scaling at www.AVDC.org.
3. www.AAHA.org for mandate regarding dentistry without anesthesia and intubation
4. For clinic fliers and PDF document downloads on the Do’s and Don’ts of Antimicrobial Therapy, visit http://jav.ma/antibioticresources.